SIMPLIFIED LESSONS IN CARE OF AUTOMOBILE

Different Uses and Composition of Roller Bearings Interestingly Illustrated.

LUBRICATION AND CLEANLINESS

This About Only Care These Important Parts Require—Rust, However, Is Enemy to Bearings, Which Should be Remembered.

Lesson No. III.

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The bearings used in the engine are almost universally of the babbitt or bronze type, the ball or roller bearing seldom being used. One reason for this is that an engine bearing is subjected to considerable heat, and this heat might result in the expansion of the balls or rollers (the clearances of which are extremely small), and so cause a binding. Again, most of the engine bearings are constantly subjected to blows, under which the hardened balls or rollers or their raceways would be liable to crack.

On almost all other parts of the automobile, the ball or roller bearing is generally used, there seldom being found the babbitt or bronze bearing excepting where the movement is but slight, as in the universal joints, spring saddles and axles, shackles, etc.

As we said before, parts can move on one another in three ways: namely, linealy or in a line, as for example, the pistons; they can revolve one in the other, as the transmission gear shafts, or two flat surfaces can spin or revolve on one another. As in the latter case, the pressure is in the form of a thrust, the bearing used is called a "Thrust Bearing," while those used for the second case are called "Journal Bearings."

Figures 1 and 2 show a ball bearing as is used in the transmission, differential, wheels, etc. Here A is the outer raceway, B the inner raceway, C the balls and D the ball retainer, or cage. When these bearings are worn or broken, about the only thing that can be done is to replace them. The writer does not advise repairing them.

About the only care these bearings require is lubrication, and extreme cleanliness. If the slightest piece of metal goes into the bearing, it may result in the crushing of the balls and raceway. This would be indicated by a scratching sort of noise when the car is running.

Figure 3 shows what is known as a radax ball bearing. This type of bearing is usually found in the front wheels. Novices, when putting the wheel back after greasing the bearing, sometimes make the mistake of getting the balls and their retainer reversed, getting the portion A where B should be. The fact that A is larger than B, naturally leads to the belief that it should come to the larger outer raceway. When this is done the bearing will likely be ruined.

Figure 4 shows an excellent type of roller bearing—the Hyatt flexible. If the roller of a roller bearing were to take a position which is not absolutey parallel to its shaft, it would be subjected to a bending strain, for which reason a plain solid roller is not practical in a bearing. As the Hyatt bearing is designed, the roller can bend without breaking. The Hyatt bearings will be found in a very large percentage of the cars built.

Another excellent and much-used roller bearing is the Timken, which has short-tapered rollers. As it is designed, it will also act as a thrust bearing to some extent. Because of the taper, wear can be taken out by simply tightening the nuts which hold the bearing in place. When tightening bearings of the adjustable type, the wheels must be jacked up, and the bearing tightened as much as possible without making it impossible to spin the wheel by hand. The wheel must not "bind."

Figure 5 shows a ball-thrust bearing. Here A and B are the raceways and C the retainer with its balls.

"HUM" OR "GROWL" DUE TO WORN BEARINGS.

A large amount of the "hum" or "growl" which develops in the transmission and the differential is due to the worn bearings, as when the bearings become worn, not only will they permit the gears to become a little too far apart, but they will allow a certain amount of side play for the shaft.

The way to tell if a bearing of the typs shown in Figs. 1 and 2 is worn, is to see how much the inner raceway B, can be moved sideways with respect to the outer raceway. You can't judge this well by trying to move the raceways toward one another.

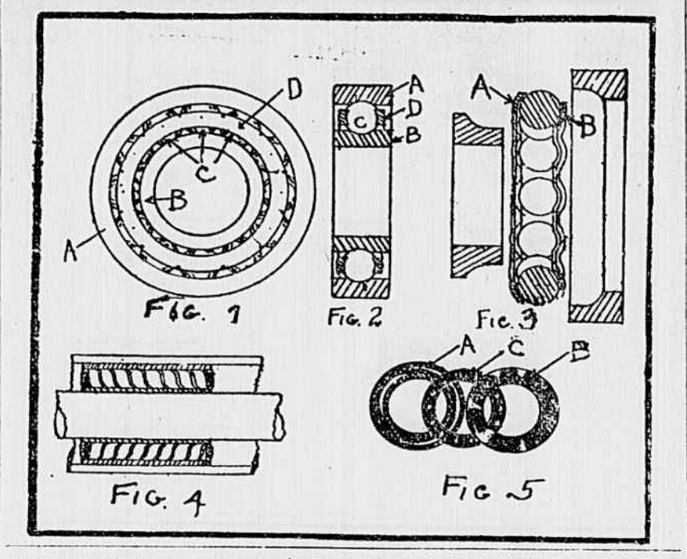
To repair a worn ball bearing the raceways must be reground and larger balls inserted. Whether or not, therefore, it pays to have a bearing repaired is questionable. It will be weakened, and the repair is expensive.

Both the raceways and the balls are hardened, and therefore brittle to some extent. This means that care must be exercised in installing them. They should never be driven into position by hard blows of a hammer. If they can not be pressed in, a gentle tapping on a soft tool or piece of metal will generally move them, though the movement will often be slow and the work require patience. Many a bearing has been ruined because of the raceways was cracked when the bearing was installed.

When ordering roller bearings, it is only necessary to give their number, which will be found on one of the raceways. If you find a number of numbers, and so do not feel certain of the right one, give the dimensions, but the numbers also, as the number will help the dealer to give you the correct bearing, even though you may have failed to give all of the dimensions required.

Rust is a great enemy of ball bearings, and so if you put your car up for some time, be sure that all roller and ball bearings are well greased.

Composition of Roller Bearings



QUESTIONS AND ANSWERS

Q. Do you think that the thrust washers on side of the differential gear act in any way as grease retainers. The axle and there is no felt in that part of the axle housing. Is it possible that if they were a good close fit on the outside washer (babbitt or bronze) had a bearing surface against the steel washers on each side that they might act as grease retainers in that way?

A. The thrust washers act but slightly as grease retainers, and in fact they should not, as grease must get to the roller bearing beyond them. If a grease cup is used in the washers you will probably find that they will quickly burn out. At the time these washers are furnished with a rather fit and many burned out so that service stations soon got into the habit of shaving a little off the thickness. There is a special retainer on the market which can be had at most Ford service stations and which I believe has proven satisfactory.

Q. I have a car which is equipped with the Simms Huff motor generator about which I would like a little information. First: Will you describe the generator circuit, so that I can check up my wiring and see if it is wired correctly? Second: My motor generator makes a very loud humming while running with the cut-out on charge. It sounds more like some rough gears than anything else. It cannot be heard if the cut-out points are held open—what causes this? Third: Is there anything I can do to make my car ride any easier? It is almost impossible to stay in the seat when going over a rough road. It seems to spring up and down too easy. I have shock absorbers on the rear. I do not know whether they help any or not. They are of a spring type inclosed in a case. Fourth: I cannot seem to get my engine to run smooth at low speed, although it runs perfect when car is idle. There is considerable lost motion in the rear end. Would this have any effect on the engine? L. M. G.

A. Wiring of motor circuit—Ground one negative of the battery. Connect positive of third cell to upper left terminal of starting switch. Connect upper right terminal to negative of cell six. Connect positive of all four to lower right of starting switch, and lower middle of this switch to large terminal on end of motor generator. Wiring of generator—Run a wire from the same large terminal of the motor generator as mentioned above to top middle terminal on dash panel. From top left-hand terminal of dash panel run wire to the terminal on the side of the generator. From top right terminal of panel run a wire to the regulator shunt contact. When the cut-out is closed the generator magnets are magnetized and they then tend to push the armature out of the pole pieces as though it were a plunger. This action, coupled with play in your bearings, is the cause of the noise. Try grabbing the spring leaves. Also try the car without the shock absorbers. The lost motion in the rear end may make the engine seem to run irregularly, though I believe you will find the compression to be uneven. You may also have a poor spark plug.

Q. There is quite a valve tap in my car, which is a 1913 (——). I have gone over the adjustments a number of times, but it does not help any. At high speed all the valves seem noisy. Is there any way I can get rid of this noise? J. M.

A. The valve springs may be weak, and the valves have a tendency to stick, so that the cam sort of runs away from them, until the compression pressure on the valve head forces them down, when you will get the tap. The tap may also be due to side play.

Q. I have a 1917 (——). The platinum points of the magneto burn out very frequently, and seldom last for more than 3,000 miles. What causes this and what is the remedy? R. I. G.

A. The points may be too small, or possibly the condenser has become disconnected. I would take this matter up with the makers of the magneto, as I believe one of their models was troubled with the points burning out because they were too small. In his case new points were furnished without charge.

Q. There is a steady grinding noise on the clutch of my 1914 (——) car when the car is running, or standing idle with engine running. It stops when I throw the clutch out, though. Do you think something needs oil? I have oiled everything I could find around the clutch. J. J. O'C.

A. The clutch throw-out collar and yoke are undoubtedly the cause of the noise. Pour oil over them, and when you drive do not rest your foot on the clutch pedal so as to put a downward pressure on it.

Q. When I first start my car my engine seems to run too fast for the speed of the car, and then the car suddenly gives a jump ahead. What is the matter? It is a 1915 (——). C. E. F.

A. Your clutch is slipping. Take out the plug at bottom of clutch housing and let any grease which has accumulated run out. Replace the plug and half fill the housing with kerosene. Start engine and let it run for ten or fifteen minutes, throwing out the clutch periodically. Drain off the kerosene. At first there may be a little more slipping after this treatment, but this will soon stop.

Q. Your article on tires states that "the tread of a tire should be just the right thickness of rubber and fabric, too much being as bad if not worse, than too little." I should think therefore, that a half-sole tire was not desirable. J. T. B.

A. The more rubber on the tread of a tire, of course, the longer it will wear before the fabric is reached. On the other hand, if the tread be so thick as to make a certain portion of the tire rigid, the flexing and bending coming only at a certain spot, then the fabric will tend to be weakened where the bending takes place. Experience and test alone can determine the proper thickness. Some years ago a number of well-known tires had this fault, the tire blowing out at the sides, long before the rubber of the tread had worn to any degree. I do not believe that this mistake is often made to-day, as experience has developed some well-defined rules as to the thickness of tread and fabric. The more rubber on a tire the better, provided, what might be termed the danger point, is not passed.